REMARKS

Claims 1-9 are all the claims pending in the application. The specification and Claims 1, 6, 7, and 9 have been amended. Support for the amendment to the specification is found in other sections of the specification, such as on page 23, lines 22-23, Figure 9, and Claim 4. Support for the amendments to Claims 1 and 7 is found in the specification, such as on page 11, line 1 to 23. Claims 6 and 9 have been amended to correct minor errors. Therefore, no new matter has been added.

Further, the Office Action Summary fails to indicate that the Drawings submitted on July 29, 2003 have been accepted. Acknowledgment is respectfully requested.

Claims 1-9 have been rejected under 35 U.S.C. § 103, as allegedly being unpatentable over U.S. Patent No. 6,716,796 to Iijima *et al.* ("Iijima").

Applicants respectfully traverse.

Claims 1 and 7 presently recite that the temperature of a polycrystalline substrate is set within a range from 150° C to 250° C during depositing constituent grains, an ion beam energy of an ion beam is adjusted within a range from 175 eV to 225 eV, and the oxide crystal grains having a C-type rare earth crystal structure is represented by a formula of Yb_2O_3.

Applicants respectfully submit that Iijima fails to teach or suggest the methods recited in Claims 1 and 7. Iijima teaches that the temperature of the polycrystalline substrate A is preferably in a range from 200° C to 400° C, more preferably from 250° C to 350° C, and most preferably 300° C. (column 11, lines 32-35). Such a teaching fails to provide the motivation to select a temperature range from 150° C to 250° C. In fact, Iijima teaches away from selecting a

temperature range from 150° C to 250° C, as Iijima teaches that the more preferable range is 250° C to 350° C, and most preferably 300° C.

Further, Iijima teaches that an ion beam energy is preferably in a range from 100 to 300 eV, more preferably in a range from 125 to 175 eV, and most preferably at 150 eV. (column 11, lines 36-38). Such a teaching fails to provide the motivation to select an ion beam energy within a range from 175 eV to 225 eV. In fact, Iijima teaches away from selecting an ion beam energy with a range from 175 eV to 225 eV, as it teaches that the more preferable range is 125 to 175 eV and most preferably 150 eV.

Furthermore, Iijima teaches that the chemical formula of oxide crystal grains having a C-type rear earth crystal structure may be selected from any of Y_2O_3, Sc_2O_3, Nd_2O_3, Sm_2O_3, Eu_2O_3, Gd_2O_3, Tb_2O_3, Dy_2O_3, Ho_2O_3, Er_2O_3, Yb_2O_3, Lu_2O_3, and Pm_2O_3. (Abstract). Such a teaching fails to provide the motivation to produce a polycrystalline thin film comprising oxide crystal grains having a C-type rare earth crystal structure represented by a formula Yb_2O_3. Iijima fails to provide the motivation for to select Yb_2O_3 as oxides for the polycrystalline thin film. As described in lines 4 to 16 on page 11 of the specification, when the oxide crystal possesses Yb_2O_3, the value of full width at half maximum ("FWHM") can be suppressed to 20° or less. The FWHM in X-ray diffraction corresponds to the grain boundary inclination and relates to a crystal orientation.

Moreover, a broad range that that encompasses a large number of possible distinct compositions may not automatically suggest a claimed species within the broad range. MPEP § 2144.05(I) (2005). In the present case, Iijima discloses a temperature range and an ion beam

energy range that together provide a large number of oxide crystal grains, as evidenced by the number of chemical formulas that represent the oxide crystal grains thereof. A person of ordinary skill in the art would not have been motivated to select the claimed temperature range and ion beam energy range to produce a C-type rare earth crystal structure represented by a formula Yb_2O_3. In fact, Iijima teaches away from selecting both the claimed temperature range and the ion beam energy range to produce a C-type rare earth crystal structure represented by a formula Yb_2O_3. As shown in Table 1 of Iijima, Iijima teaches that both the temperature of the substrate and the ion beam energy should be set within preferable ranges in order to provide for a particular crystal orientation in the polycrystalline thin film thereof.

Further, Applicants respectfully submit that the methods recited in Claims 1 and 7 provide for unexpected superior effects. The methods recited in Claims 1 and 7 provide a polycrystalline thin film having a crystal orientation superior than that of the polycrystalline thin film disclosed in Iijima. As described above, the FWHM in X-ray diffraction corresponds to the grain boundary inclination and relates to a crystal orientation. In the methods of Claims 1 and 7, superior crystal orientation represented by FWHM of 20° or less can be achieved.

Iijima teaches that the most preferable conditions thereof include a substrate temperature of 300° C and an ion beam energy of 150 eV. As described in column 14, line 64 to column 15, line 16, and column 16, lines 19 to 24, FIG. 13 of Iijima shows FWHM of the polycrystalline thin film deposited using the most preferable substrate temperature and ion beam energy. However, FIG. 13 of Iijima fails to show a FWHM of 20° or less. The FWHM plotted in FIG. 13 thereof is larger than 25°. As such, a person of ordinary skill in the art would not have expected

the claimed temperature range and claimed ion beam energy range to provide a FWHM of 20° or less.

As shown in Table 3, when an oxide superconducting layer is formed on the polycrystalline thin film deposited using the conditions of Claims 1 and 7, since the polycrystalline thin film has an excellent crystal orientation, it is possible to provide an oxide superconducting element having a high critical current density (lines 9 to 19 on page 38). In addition, at the interface between the superconducting layer and the polycrystalline thin film, dispersion of elements can be effectively inhibited (lines 5 to 9, page 12).

Additionally, Claims 2-6 depend from Claim 1. Claims 8-9 depend from Claim 7. Therefore, Claims 2-6 and 8-9 are not obvious for at least the same reasons as Claims 1 and 7.

In view of the above, reconsideration and allowance of this application are now believed to be in order, and such actions are hereby solicited. If any points remain in issue which the Examiner feels may be best resolved through a personal or telephone interview, the Examiner is kindly requested to contact the undersigned at the telephone number listed below.

The USPTO is directed and authorized to charge all required fees, except for the Issue Fee and the Publication Fee, to Deposit Account No. 19-4880. Please also credit any overpayments to said Deposit Account.

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